LAST NAME: FIRST NAME:

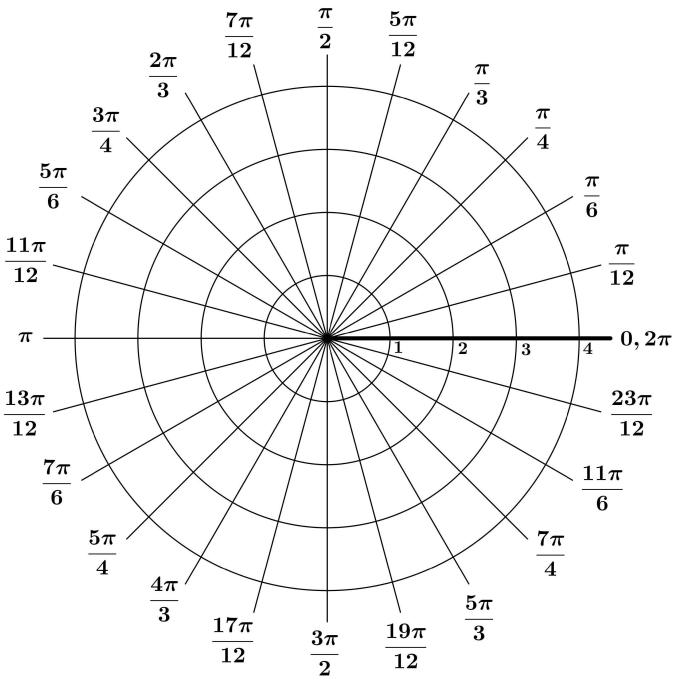
MATH 009C - Summer 2018

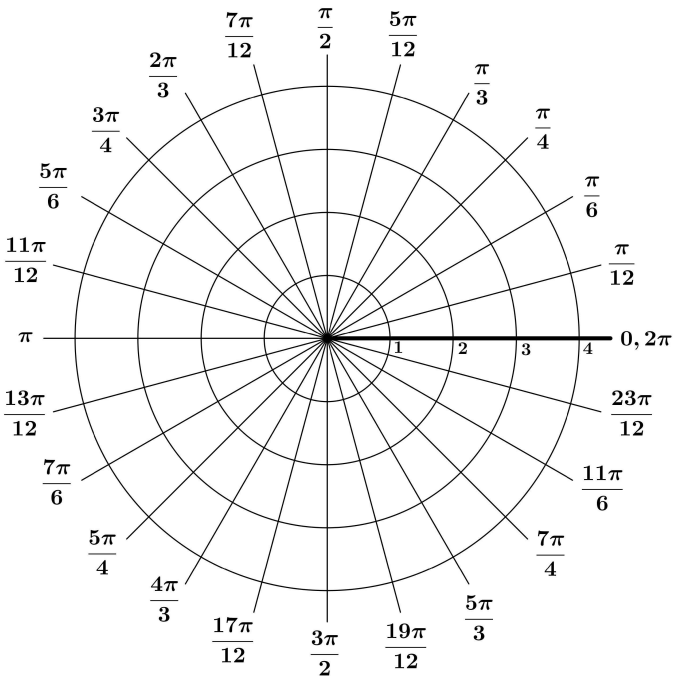
Worksheet 3: July 10, 2018

1. Give a sketch of the following polar curves. Be sure to label the x and y intercepts of the curves.

(a) $r = \sin(\theta)$

(b) $r = 4\sin(3\theta)$





Please, show all work.

2. (a) Find the slope of the tangent line to the given polar curve at the point specified by the value of θ.

$$r = 2\sin(\theta), \qquad \theta = \frac{\pi}{6}$$

(b) Find the values of θ for the given polar curve where the tangent line is horizontal and vertical (Restrict to $0 \leq \theta \leq 2\pi$).

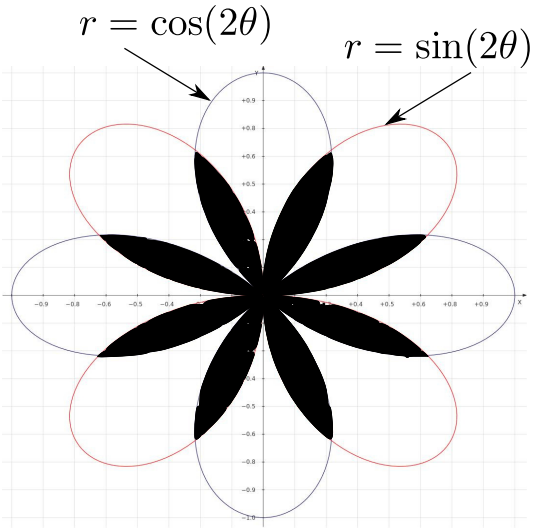
$$r = 2\sin(\theta)$$

Please, show all work.

3. Find the area of the region that lies inside the polar roses (the region is shaded in the labeled plot below), for $0 \leq \theta \leq 2\pi$.

$$r = \cos(2\theta)$$
$$r = \sin(2\theta)$$

Hint: Identities that may be helpful: 1) $\sin^2(2\theta) = \frac{1}{2} - \frac{1}{2}\cos(4\theta)$, *2)* $\cos^2(2\theta) = \frac{1}{2} + \frac{1}{2}\cos(4\theta)$.



Please, show all work.